

WHAT IS CLAIMED IS:

- 1 1. A method of making a multi-layer article, comprising:
2 chemically conditioning a surface of a layer of a first material to form a
3 conditioned surface, the first material comprising a material selected from the group
4 consisting of a buffer material and a superconductor material; and
5 disposing a layer of a second material on the conditioned surface.
- 1 2. The method of claim 1, wherein the first material comprises a superconductor
2 material.
- 1 3. The method of claim 1, wherein the first material comprises a buffer material.
- 1 ~~4.~~ ²4. The method of claim 1, wherein the conditioned surface is biaxially textured.
- 1 ~~5.~~ ³5. The method of claim 1, wherein the second material comprises a material selected
2 from the group consisting of a superconductor material and a precursor of a superconductor
3 material.
- 1 ~~6.~~ ⁴6. The method of claim 1, wherein the second material comprises a buffer material.
- 1 ~~7.~~ ⁵7. The method of claim 1, wherein the second material comprises a cap material.
- 1 ~~8.~~ ⁶8. The method of claim 1, wherein the layer of the second material is disposed on
2 the conditioned surface prior to annealing the conditioned surface.

1 9. The method of claim 1, further comprising disposing a layer of a third material on
2 a surface of the layer of the second material.

1 10. The method of claim 9, further comprising, prior to disposing the layer of the
2 third material on the surface of the layer of the second material, conditioning the surface of
3 the layer of the second material.

1 11. The method of claim 10, wherein conditioning the surface of the layer of the
2 second material includes chemically conditioning the surface of the layer of the second
3 material.

1 12. The method of claim 10, wherein conditioning the surface of the layer of the
2 second material includes thermally conditioning the surface of the layer of the second
3 material.

1 13. The method of claim 10, wherein, subsequent to conditioning the surface of the
2 layer of the second material, the surface of the second material is biaxially textured.

1 14. The method of claim 1, further comprising thermally conditioning the conditioned
2 surface.

1 15. The method of claim 1, further comprising, prior to chemically conditioning the
2 surface of the layer of the first material, disposing the layer of the first material on a surface
3 of a layer of a third material.

1 16. The method of claim 15, wherein the third material comprises a substrate
2 material.

1 17. The method of claim 15, wherein the surface of the layer of the third material is
2 biaxially textured.

1 18. The method of claim 15, wherein the third material comprises a single crystal
2 material.

1 19. The method of claim 1, wherein the second material has a critical current density
2 of at least about 1×10^6 Amperes per square centimeter.

1 20. A method of making a multi-layer article, comprising:
2 heating, at an oxygen gas pressure of less than about 700 Torr, a surface of a layer
3 of a first material to a temperature at least about 5°C above a temperature selected from the
4 group consisting of a deposition temperature of the layer of the first material and a
5 crystallization temperature of the layer of the first material to form a conditioned surface, the
6 first material comprising a material selected from the group consisting of a buffer material
7 and a superconductor material; and
8 disposing a second material layer on the conditioned surface.

1 21. The method of claim 20, wherein the first material comprises a buffer material.

1 22. The method of claim 20, wherein the first material comprises a superconductor
2 material.

1 18 23. The method of claim 20, wherein the conditioned surface is a biaxially textured
2 surface.

1 19 24. The method of claim 20, wherein the second material comprises a material
2 selected from the group consisting of a superconductor and a precursor of a superconductor.

1 20 25. The method of claim 20, wherein the second material comprises a buffer material.

1 21 26. The method of claim 20, wherein the second material comprises a cap material.

1 22 27. The method of claim 20, wherein the second material layer has a biaxially
2 textured surface.

1 23 28. The method of claim 20, wherein the temperature is from about 10°C to about
2 500°C above the temperature selected from the group consisting of a deposition temperature
3 of the first layer and a crystallization temperature of the first layer.

1 24 29. The method of claim 20, wherein the temperature is from about 75°C to about
2 300°C above the temperature selected from the group consisting of a deposition temperature
3 of the first layer and a crystallization temperature of the first layer.

1 25 30. The method of claim 20, wherein the oxygen gas pressure is less than about 100
2 Torr.

1 26 31. The method of claim 20, wherein the oxygen gas pressure is less than about 1
2 Torr.

1 32. The method of claim 20, wherein the surface of the layer of the first material is
2 heated in an environment comprised primarily of hydrogen and inert gas.

1 33. The method of claim 20, wherein the surface of the layer of the first material is
2 heated in an environment comprised primarily of inert gas.

1 34. The method of claim 20, further comprising, prior to heating the surface of the
2 layer of the first material, disposing the layer of the first material on a surface of a layer of a
3 third material.

1 35. The method of claim 34, wherein the third material comprises a substrate
2 material.

1 36. The method of claim 34, wherein the third material comprises a material selected
2 from the group consisting of nickel and silver.

1 37. The method of claim 34, wherein the surface of the layer of the third material is
2 biaxially textured.

1 38. The method of claim 34, wherein the third material comprises a single crystal
2 material.

1 39. The method of claim 20, further comprising chemically conditioning the
2 conditioned surface.

1 40. The method of claim 20, wherein the second material has a critical current density
2 of at least about 1×10^6 Amperes per square centimeter.

1 41. A method of making a multi-layer article, comprising:
2 heating a surface of a layer of a first material to a temperature at least about 5°C
3 above a temperature selected from the group consisting of a deposition temperature of the
4 layer of the first material and a crystallization temperature of the layer of the first material to
5 form a conditioned surface, the first material comprising a material selected from the group
6 consisting of a buffer material and a superconductor material, the first material being
7 disposed on a surface of a polycrystalline material; and
8 disposing a second material layer on the conditioned surface.

1 42. The method of claim 41, wherein the first material comprises a buffer material.

1 43. The method of claim 41, wherein the first material comprises a superconductor
2 material.

1 44. The method of claim 41, wherein the conditioned surface is biaxially textured.

1 45. The method of claim 41, wherein the polycrystalline material comprises a
2 substrate material.

1 46. The method of claim 41, wherein the polycrystalline material comprises a
2 textured material.

1 47. The method of claim 46, wherein the textured material has a biaxially textured
2 surface.

1 48. The method of claim 41, wherein the second material comprises a material
2 selected from the group consisting of a superconductor and a precursor of a superconductor.

1 49. The method of claim 41, wherein the second material comprises a buffer material.

1 50. The method of claim 41, wherein the second material layer has a biaxially
2 textured surface.

1 51. The method of claim 41, wherein the temperature is from about 10°C to about
2 500°C above the temperature selected from the group consisting of a deposition temperature
3 of the first layer and a crystallization temperature of the first layer.

1 52. The method of claim 41, wherein the temperature is from about 75°C to about
2 300°C above the temperature selected from the group consisting of a deposition temperature
3 of the first layer and a crystallization temperature of the first layer.

1 53. The method of claim 41, further comprising chemically conditioning the
2 conditioned surface.

1 54. The method of claim 41, wherein the second material has a critical current density
2 of at least about 1×10^6 Amperes per square centimeter.

1 55. The method of claim 20, wherein the surface of the layer of the first material is
2 heated in an environment comprising water vapor.

1 56. The method of claim 20, wherein of the environment further comprises hydrogen
2 and an inert gas.

1 57. The method of claim 41, wherein the surface of the layer of the first material is
2 heated in an environment comprising water vapor.

1 58. The method of claim 57, wherein of the environment further comprises hydrogen
2 and an inert gas.